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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/596,497

07/06/2007

Giacomo Pollarolo

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2887

7055 7590 10/03/2008  
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EXAMINER

NGUYEN, ANDREW H

ART UNIT

PAPER NUMBER

3746

NOTIFICATION DATE

DELIVERY MODE

10/03/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com  
pto@gbpatent.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/596,497	<b>Applicant(s)</b> POLLAROLO, GIACOMO	
	<b>Examiner</b> ANDREW NGUYEN	<b>Art Unit</b> 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-10 is/are rejected.
- 7) ☒ Claim(s) 7 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/15/06</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the resonators being mounted ... in positions asymmetrical with respect to one another, both in a radial direction and in the axial direction must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

2. The disclosure is objected to because page 10, 1<sup>st</sup> paragraph teaches the resonators having an axis of symmetry (B) parallel to one another. It is unclear how this is done because the resonators are taught to be arranged circumferentially around the annular combustor. That means axis B is pointing in a radial direction and the resonators, which are spaced circumferentially, all have axes that are angled relative to each other, not parallel.

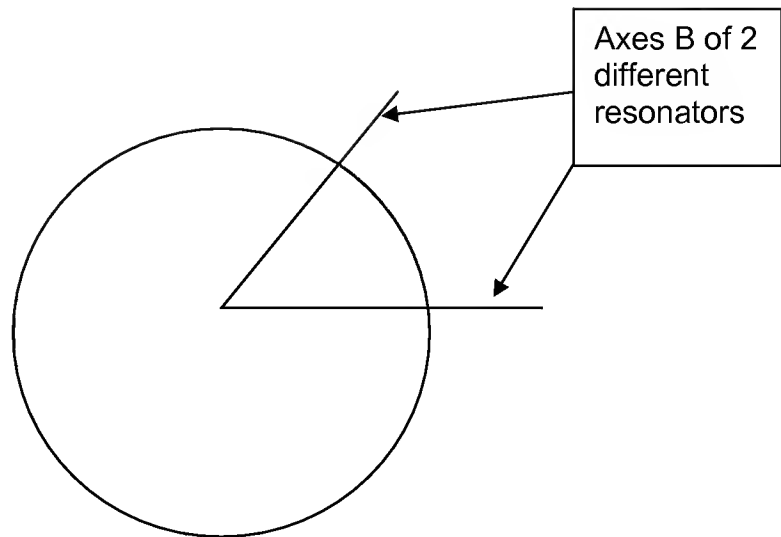
Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 8 claims the resonators having an axis of symmetry (B) parallel to one another. It is unclear how this is done because the resonators are taught to be arranged circumferentially around the annular combustor. That means axis B is pointing in a radial direction and the resonators, which are spaced circumferentially, all have axes that are angled relative to each other, not parallel (see dwg below).



***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 6,464,489 to Gutmark et al (Gutmark).

Regarding claim 1:

Gutmark teaches:

*A system for damping thermo-acoustic instability in a combustor device for a gas turbine (Fig 6), the combustor device comprising at least one combustion chamber (16) and at least one burner (14) associated to said combustion chamber and mounted in a position corresponding to a front portion set upstream*

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*of the combustion chamber (Fig 6; burner 14 in upstream end of chamber 16); the damping system comprising at least one Helmholtz resonator (10), in turn comprising a casing defining inside it a pre-set volume (inherent) and a neck for hydraulic connection between said pre-set volume and said combustion chamber (neck connects chambers 10 and 16); said system being characterized in that said neck is connected to one side of said combustion chamber distant from said front upstream portion thereof provided with said at least one burner (neck is downstream of burner 14).*

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-2 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,373,695 to Aigner et al (Aigner) in view of US Patent 6,464,489 to Gutmark et al (Gutmark).

#### Regarding claim 1:

Aigner teaches a Helmholtz resonator (21) for a gas turbine combustor. The resonator comprises a casing, a volume (50), and a neck (52) that opens to the combustion chamber. The combustor has burners 20 mounted at an upstream end. Aigner fails to teach the resonator distant from the front upstream portion of the

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combustor. However, Gutmark teaches installing the resonators at a point downstream of the burners in a circumferential position about the combustion chamber in order to optimize the effectiveness of the resonators (col 8 lines 19-25). It would have been obvious to one of ordinary skill in the art at the time of the invention to move the resonators of Aigner to a point downstream of the burners in order to optimize the resonator effectiveness, as taught by Gutmark.

Regarding claim 2:

Aigner further teaches:

*characterized in that said combustion chamber is of an annular type (col 3 lines 12-13), housed within an air case (13) for delivery of air for supporting combustion set outside an annular body delimiting said combustion chamber (36).*

Gutmark further teaches:

*said at least one resonator being set in a circumferential position about said combustion chamber (Fig 6)*

Regarding claims 8 and 9:

Aigner further teaches:

*characterized in that said casing and said neck of said at least one resonator have a cylindrical symmetry (Fig 3; resonators 21 have circular cross section)*

Gutmark further teaches:

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*and are arranged with respective axes of symmetry thereof parallel to one another and oriented to form a pre-set angle with a direction of flow of burnt gases that traverse said combustion chamber characterized in that said pre-set angle is substantially of 90.degree*  
(Fig 6; resonators positioned circumferentially about the combustor, perpendicular to the combustor flow).

Regarding claim 10:

Aigner further teaches:

*characterized in that it comprises more than one of said Helmholtz resonators*  
(Fig 3, multiple resonators 21), *said combustor comprising more than one of said burners* (Fig 3, multiple burners 20);

Gutmark further teaches:

*said resonators being mounted circumferentially in a ring, in cantilever fashion on said annular body delimiting said combustion chamber* (Fig 6; resonators 10 arranged circumferentially about combustor liner), *in positions asymmetrical with respect to one another, both in a radial direction and in the axial direction with reference to an axis of symmetry of said annular combustion chamber* (defined by Applicant as meaning "arranged circumferentially set at a distance apart from one another and axially at a distance from the burners with an irregularly varying pitch"; resonators are spaced circumferentially apart from each other - col 8 lines 4-12 and axially apart from each other - Fig 8, 10a, 10b), *and with the respective*



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*necks hydraulically connected to a downstream portion of said combustion chamber (col 8 lines 19-24).*

9. Claims 3-5 rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,373,695 to Aigner et al (Aigner) in view of US Patent 6,464,489 to Gutmark et al (Gutmark) as applied to claim 2 above, and further in view of US Patent 6,530,221 to Sattinger et al (Sattinger).

Regarding claims 3-5:

112(6) is applied for claim 3 to the "means for delivery of a cooling fluid." The means are taught by Applicant to be the plurality of cooling holes 18 through the casing 13 that enable passage of air from air case 16 to the combustion chamber (page 10 2<sup>nd</sup> paragraph). Aigner teaches a single cooling hole (51) that is used to keep the resonator from overheating by passing air from the casing, through the volume, through the neck, and to the combustion chamber. Aigner fails to teach a plurality of the cooling holes. However, it was known in the art, as taught by Sattinger, to provide resonators with a plurality of cooling holes in the resonator casing in order to provide additional air (57; Fig 5c). It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the single cooling hole of Aigner with the plurality of cooling holes of Sattinger in order to provide additional cooling/purge air to the resonator, as taught by Sattinger. Sattinger further teaches the holes arranged asymmetrically. The axis (to determine symmetry) can be at an angle, or offset from the middle of the plate (since

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the claim has not defined the axis), which would make the holes asymmetric to each other.

10. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 5,373,695 to Aigner et al (Aigner) in view of US Patent 6,464,489 to Gutmark et al (Gutmark) as applied to claim 2 above, and further in view of US Patent 6,370,879 to Stalder et al (Stalder).

Regarding claim 6:

112(6) is applied for claim 6 to the “means for selectively varying said pre-set volume within a pre-set range.” The means are taught by Applicant to be the two walls (22, 21) that are threadably coupled and adjusted. Aigner in view of Gutmark fails to teach adjusting the resonator volume by two walls that are threadably coupled.

However, it was known in the art to adjust the volume of the Helmholtz resonator by telescoping two components using screw threads (col 4 lines 18-24) in order to tune the resonator to the desired frequencies (col 2 lines 60-65). It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the resonator of Aigner with the threaded adjustable resonator of Stalder in order to tune the resonator to desired frequencies, as taught by Stalder.

***Allowable Subject Matter***

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11. Claim 7 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 7:

The prior art fails to teach a Helmholtz resonator that is mounted on a gas turbine combustor wall, that has two tubular bodies with concavities facing one another, and that is telescopically adjusted using screw threads between the bodies. Stalder teaches using screw threads to adjust the volume but does not disclose the two cup shaped tubular bodies with concavities facing one another nor the fixing ring nut. JP 51-014550 (JP51) teaches an acoustic suppression device that uses two cup-shaped bodies facing one another, but it would not have been obvious to combine the references because JP51's device is not a Helmholtz resonator. The suppression device of JP51 completely surrounds the main flow path instead of being connected to it via a neck, as in a Helmholtz resonator. Neither of the references teaches a threaded fixing ring nut that is coupled to the cup-shaped body that is provided in a single piece with the neck.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANDREW NGUYEN whose telephone number is (571)270-5063. The examiner can normally be reached on 8 am - 5 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/  
Supervisory Patent Examiner, Art  
Unit 3746

/AN/